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REMARKS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments, and the following remarks.

The amendments to this patent application are as follows. The Specification has been amended on page 1 to correct a minor typographical error. The claims have been amended to overcome the various formal objections of the Patent Examiner. Also dependent method claim 28 has been rewritten as an independent claim and is no longer a "hybrid" claim wherein method depended from composition.

Thus in claim 21, proper antecendent basis has been provided for "standard blend ingredients and for "mixture." In the other claims, "characterized in that" has been changed to "wherein," wherever appropriate. In claim 37, unnecessary spacing has been deleted. In other claims, "preferably" has been cancelled, wherever appropriate.

In claim 21, the terms "standard blend ingredients" and "mixture" would be understood by any person skilled in the art. Therefore, claim 21 is believed to be comprehensible.

Concerning the other formal objections to the term "phase inversion," the Applicants comment as follows.

Thermoplastic vulcanizates are also referred to as thermoplastic elastomers (abbreviated designation: TPE) or thermoplastics.

These materials combine both thermoplastic and elastic properties.

Viewed individually, thermoplastics and elastomers have different properties and exhibit different behaviors within defined temperature ranges.

Thermoplastics change to a viscous flow at some temperature, as opposed to elastomers. More detailed information will be found in the attached DIN 7724 standard, supplemental sheet, where these materials are explained in greater detail (Attachment 1 in German and English).

Now, it is a foregone conclusion that in the manufacture of a thermoplastic vulcanizate, the thermoplastic (A) and the rubber (C) have to be compatible with each other. This compatibility is to be considered within the background of the different ways the individual components behave within defined temperature ranges

(phases).

In connection with the thermoplastic vulcanizates, the term that is generally used and widely applied also in the relevant literature is the term "phase inversion." Please refer by way of example to the INTERNCT information (which is attached hereto as Attachment 2) in that regard.

This technological information has been briefly mentioned also within the framework of the application in the present Specification (page 7, Attachment 3, where it is underlined). The literature sources according to Attachments 1 and 2, therefore, could be referred to there as well.

This technological information was not recited, in the original claims. The added independent claim 21 is a summary or combination of the original claims 1, 2, 3 and 8.

Therefore claim 21 was amended in order to delete the objected to terminology that recites the following:

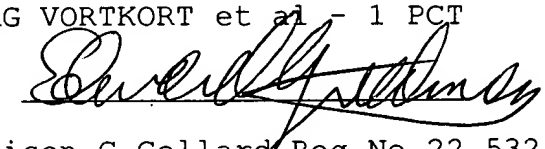
"being compatible with the thermoplastic synthetic resin (A) in regard to the phase inversion."

For all of the reasons set forth above, all of the claims are now believed to be in complete compliance with the requirements of 35 U.S.C. 112. Withdrawal of this ground of rejection is respectfully requested.

Thus the present patent application is believed to be in condition for allowance. A prompt notification of allowability is respectfully requested.

Respectfully submitted,

JÖRG VORTKORT et al - 1 PCT

By: 

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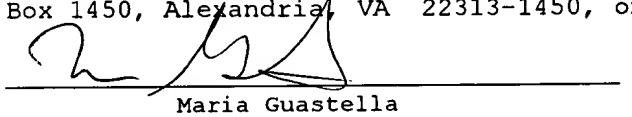
Enclosures:

1) Attachment 1 in German and English
2) Attachment 2
3) Attachment 3
4) Copy of Petition for three Month Extension of Time

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 25, 2003.



Maria Guastella

Attachment 1

Extract from DIN 7724 (supplemental sheet):

Grouping of High Polymeric Materials on the Basis of the Effect of Temperature on their Mechanical Behavior: Simplified Summary

2.2 Thermoplastic (elastomers)

Thermoplastics are high polymeric materials that are not cross-linked - or not homogeneously cross-linked - until the decomposition temperature is reached. At low temperatures, they exhibit the elasticity of steel, and they flow in a viscous manner at some temperature below the decomposition temperature. A more or less wide temperature range, in which the material exhibits the elasticity of rubber, may be

disposed between the range where the material has the elasticity of steel, and the flow range. The viscous flow is characterized by a drop of the modulus in shear, to values that are no longer measurable in the oscillating twisting test.

Examples:

Polystyrene that can be formed under heat

Polyethylene that can be formed under heat

Hard and soft PVC (polyvinyl chloride)

Urethane polymers that are cross-lined in a thermally unstable manner.

2.3 Elastomers

Elastomers are high-polymer materials that are cross-lined in a wide-meshed way until the decomposition temperature is reached. At low temperatures, they exhibit the elasticity behavior of steel, and they do not flow in a viscous manner even at high temperatures, but they exhibit the elasticity of rubber, starting from 20°C or a lower temperature, up to the decomposition temperature. Their elasticity of rubber is characterized by largely temperature-independent shear modulus values between about 1 and 10^5 kp/cm², as well as by high, reversible deformability.

Examples:

Natural rubber cross-lined with about 1 to 10% sulfur.
Very high-molecular polyisobutylene (physically cross-lined due to chain interlooping).

2.4 Thermoplastics*

Thermoplastics are high-polymer materials cross-linked with wide meshes up to the decomposition temperature. At low temperatures, they exhibit the elasticity of steel, and they do not flow viscously even at high temperatures, but exhibit the elasticity of rubber, starting from 20°C or a higher temperature, up to the decomposition temperature. Their rubber-elasticity is characterized by largely temperature-independent shear modulus values between about 1 and 10^2 kp/cm^2, as well as by high, reversible deformability.

Examples:
Natural rubber cross-lined with more than 10% sulfur.
Polyethylene cross-lined with wide meshes.
Very high-molecular polymethacrylic acid esters (physically cross-lined due to chain interlooping).

*Material as defined by the invention

DK 678.4/.8 : 678.01 : .096 : 001.4 DEUTSCHE NORMEN Februar 1972

Gruppierung hochpolymerer Werkstoffe auf Grund der Temperaturabhängigkeit ihres mechanischen Verhaltens
Vereinfachte Zusammenfassung

DIN 7724 Beiblatt

Grouping of high-polymeric materials on the basis of the effect of temperature on their mechanical behaviour; simplified summary

1. Zweck und Anwendung

Dieses Beiblatt enthält eine vereinfachte Zusammenfassung der Festlegungen über die Gruppierung hochpolymerer Werkstoffe nach DIN 7724. Es kann nur einer ersten Orientierung dienen. Für die genaue Abgrenzung der einzelnen Gruppen hochpolymerer Werkstoffe müssen die Angaben in DIN 7724 herangezogen werden. Dort finden sich auch nähere Angaben über das physikalische Verhalten hochpolymerer Werkstoffe.

2. Gruppierung und Begriffe

2.1. Allgemeines

Nach den Angaben in DIN 7724 werden für hochpolymere Werkstoffe an Hand der Temperaturabhängigkeit des Schubmoduls und des mechanischen Verlustfaktors, die nach DIN 53 445 bzw. DIN 53 520 ermittelt wird, Gruppierungen vorgenommen und folgende Begriffe festgelegt:

Thermoplaste (Plastomere)
Elastomere
Thermoelaste
Duroplaste (Duromere).

2.2. Thermoplaste (Plastomere)

Thermoplaste sind bis zur Zersetzungstemperatur nicht vernetzte – oder nicht homogen vernetzte – hochpolymere Werkstoffe, die sich bei niederen Temperaturen stahlelastisch verhalten und die bei irgendeiner Temperatur unterhalb ihrer Zersetzungstemperatur viskos fließen. Zwischen dem Bereich der Stahlelastizität und dem Fließbereich kann ein mehr oder weniger breites Temperaturgebiet liegen, in dem sich der Werkstoff gummielastisch verhält. Viskoses Fließen ist durch einen Abfall des Schubmoduls auf im Torsionsschwingungsversuch nicht mehr meßbare Werte gekennzeichnet.

Beispiele:
In der Wärme formbares Polystyrol
In der Wärme formbares Polyäthylen
Hart- und Weich-PVC (Polyvinylchlorid)
Thermolabil vernetzte Urethanpolymere.

2.3. Elastomere

Elastomere sind weitmaschig bis zur Zersetzungstemperatur vernetzte hochpolymere Werkstoffe, die sich bei niederen Temperaturen stahlelastisch verhalten und die auch bei hohen Temperaturen nicht viskos fließen, sondern von 20 °C oder einer tieferen Temperatur bis zur Zersetzungstemperatur gummielastisch sind. Gummielastizität ist durch weitgehend temperaturunabhängige Schubmodulwerte zwischen etwa 1 und 10^3 kp/cm² und große reversible Deformierbarkeit gekennzeichnet.

Beispiele:
Mit etwa 1 bis 10 % Schwefel vernetzter Naturkautschuk
Sehr hochmolekulares (durch Kettenverschlaufungen physikalisch vernetztes) Polyisobutylen.

2.4. Thermoelaste *

Thermoelaste sind weitmaschig bis zur Zersetzungstemperatur vernetzte hochpolymere Werkstoffe, die sich bei niederen Temperaturen stahlelastisch verhalten und die auch bei hohen Temperaturen nicht viskos fließen, sondern von 20 °C oder einer höheren Temperatur bis zur Zersetzungstemperatur gummielastisch sind. Gummielastizität ist durch weitgehend temperaturunabhängige Schubmodulwerte zwischen etwa 1 und 10^2 kp/cm² und große reversible Deformierbarkeit gekennzeichnet.

Beispiele:
Mit über 10 % Schwefel vernetzter Naturkautschuk
Weitmaschig vernetztes Polyäthylen
Sehr hochmolekulare (durch Kettenverschlaufungen physikalisch vernetzte) Polymethacrylsäureester.

2.5. Duroplaste (Duromere)

Duroplaste sind engmaschig bis zur Zersetzungstemperatur vernetzte hochpolymere Werkstoffe, die bei niederen Temperaturen stahlelastisch sind und auch bei hohen Temperaturen nicht viskos fließen, sondern sich zwischen 50 °C oder einer höheren Temperatur und der Zersetzungstemperatur bei sehr begrenzter Deformierbarkeit elastisch verhalten. Der Schubmodul unterschreitet bei keiner Temperatur 10^2 kp/cm².

Beispiele:
Gehärtete Polyesterharze
Gehärtete Epoxydharze
Gehärtete Phenol-Formaldehydharze.

* erfindungsgemäßer Werkstoff

Translate marked portions only

Ausschuß Gemeinsame Terminologiefragen auf dem Gebiet der hochpolymeren Werkstoffe im Deutschen Normenausschuß (DNA)

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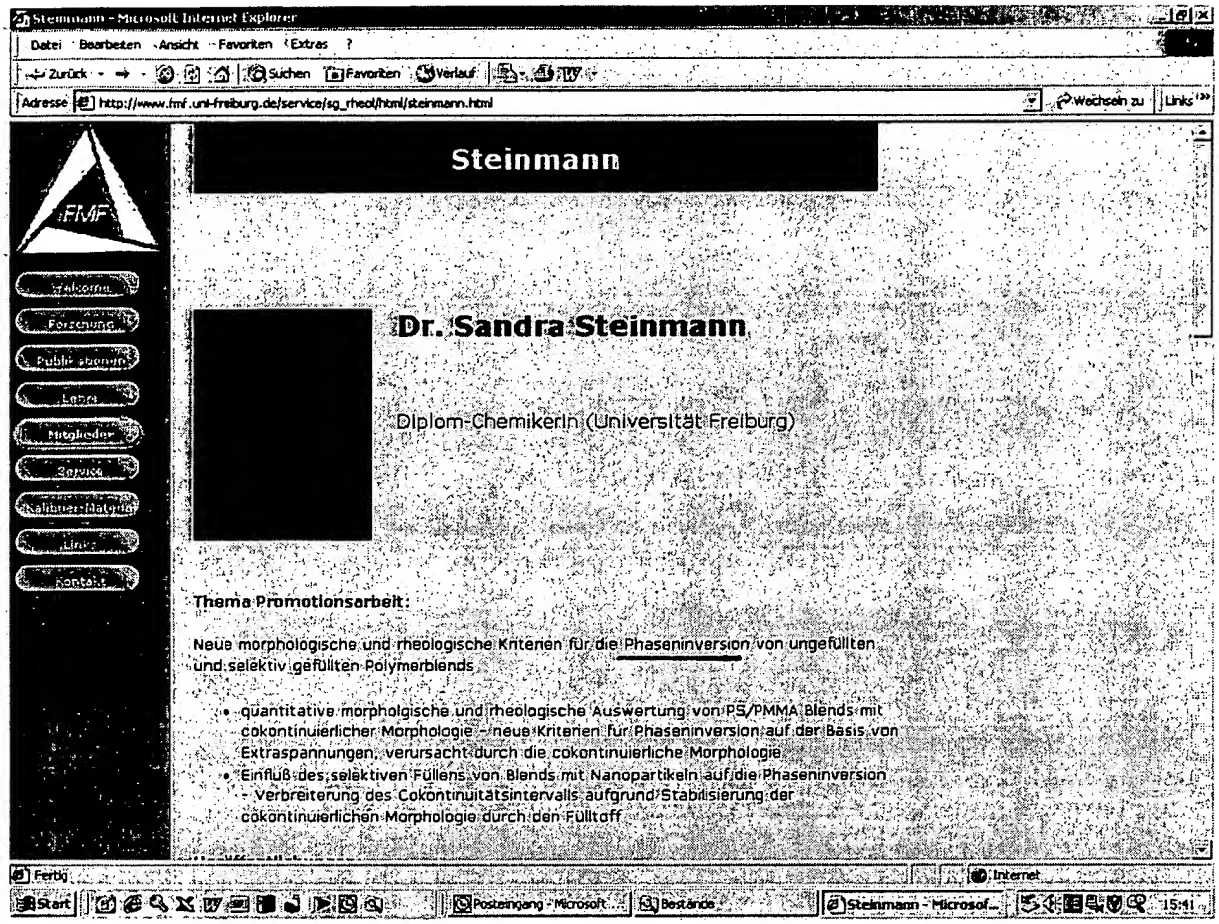
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Dr. Sandra Steinmann
Diplom-Chemikerin (Universität Freiburg)
Thema Promotionsarbeit:
Neue morphologische und rheologische Kriterien für die Phaseninversion von ungefüllten und selektiv gefüllten Polymerblends
quantitative morphologische und rheologische Auswertung von PS/PMMA Blends mit cokontinuierlicher Morphologie - neue Kriterien für Phaseninversion auf der Basis von Extraspannungen, verursacht durch die cokontinuierliche Morphologie
Einfluß des selektiven Füllens von Blends mit Nanopartikeln auf die Phaseninversion - Verbreiterung des Cokontinuitätsintervalls aufgrund Stabilisierung der cokontinuierlichen Morphologie durch den Füllstoff
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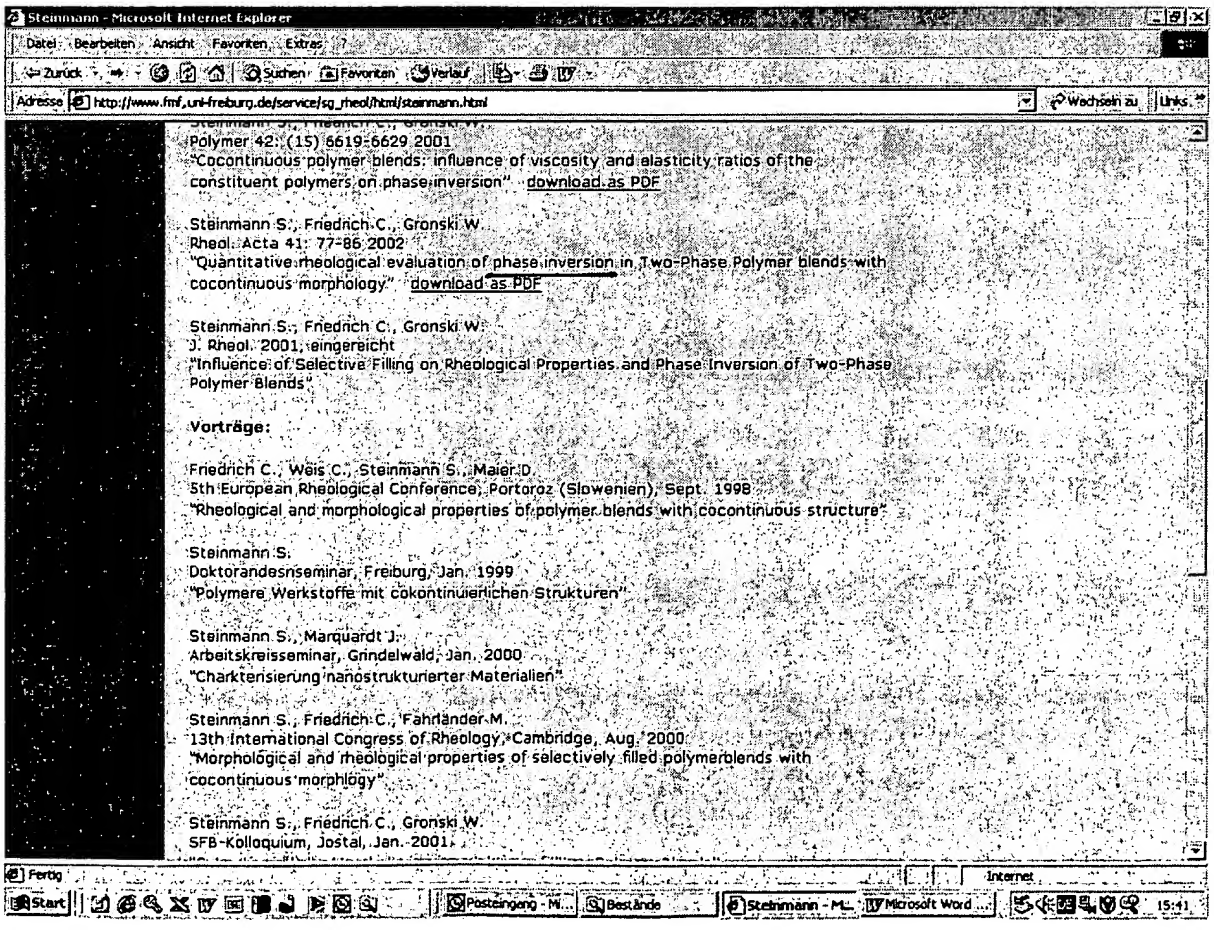
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"Cocontinuous polymer blends: influence of viscosity and elasticity ratios of the constituent polymers on phase inversion" download as PDF
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"Influence of Selective Filling on Rheological Properties and Phase Inversion of Two-Phase Polymer Blends"
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"Morphological and rheological properties of selectively filled polymerblends with cocontinuous morphology"
Steinmann S., Friedrich C., Gronski W.
SFB-Kolloquium, Jostal, Jan. 2001
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density of 0.88 to 0.91 g/cm³ at 20°C and/or a ULDPE (= ultra low density polyethylene) with a density of 0.85 to 0.88 g/cm³ at 20°C.

The component of the non-cross-linked polyethylene usefully amounts to from 5 to 25% by weight and from 5 to 15% by weight, respectively, again based on the sum of the four components (A, B, C, D).

Vulcanized rubber (C)

Various types of rubber can be employed such as, for example types based on natural rubber (NR), butyl rubber (BR), styrene-butadiene rubber (SBR), nitrile rubber (NBR), or an ethylene-propylene-diene copolymer (EPDM), whereby attention has to be paid to its compatibility with the thermoplastic (A) particularly with respect to the phase inversion. *

The rubber employed is preferably an EPDM rubber. The third monomer may be hexadiene-1,4, dicyclopentadiene, or in particular ethylidene-norbonene.

The at least partially vulcanized rubber (C) usefully has a degree of cross-linking of > 90%, in particular > 95%. A method for the determination of the degree of cross-linking is described in patent US-A-4,311,628.

* Dem Fachmann steht hier eine umfangreiche Literatur zur Verfügung.

PATENT

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APPLICANTS: VORTKORT ET AL -1 PCT

SERIAL NO.: 09/913,613 EXAMINER: W.CHEUNG

FILED: AUGUST 15, 2001 GROUP: 1713

TITLE: THERMOPLASTIC VULCANIZATE AND ITS METHOD OF PRODUCTION

PETITION UNDER RULE 136(a) AND RULE 17(a)(3)

MAIL STOP FEE AMENDMENT
Commissioner for Patents
P.O.BOX 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants petition the Commissioner of Patents and Trademarks, under Rule 136(a), to extend the time for response to the Office Action dated MARCH 25, 2003, for three months, from JUNE 25, 2003 to SEPTEMBER 25, 2003. Submitted herewith, under Rule 17(a)(3), is a check in the amount of $930.00 to cover the cost of the extension for a Large Entity.

The Commissioner is hereby authorized to charge any additionally required fee, or to credit any overpayment, to our Deposit Account No. 03-2468.

Respectfully submitted,

JÖRG VORTKORT et al - 1 PCT

By: _____
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Enclosure: Check in the amount of $930.00 for a Large Entity

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Maria Guastella

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